

**EMBEDDING AND ENCAPSULATION OF SENSITIVE  
COMPONENTS INTO A MATRIX TO OBTAIN DISCRETE  
CONTROLLED RELEASE PARTICLES**

**ABSTRACT OF THE DISCLOSURE**

5           Controlled release, discrete, solid particles which contain an encapsulated  
and/or embedded component such as a heat sensitive or readily oxidizable  
pharmaceutically, biologically, or nutritionally active component are  
continuously produced without substantial destruction of the matrix material or  
encapsulant. A release-rate controlling component is incorporated into the  
10       matrix to control the rate of release of the encapsulant from the particles. The  
additional component may be a hydrophobic component or a high water binding  
capacity component for extending the release time. The plasticizable matrix  
material, such as starch, is admixed with at least one plasticizer, such as water,  
and at least one release-rate controlling component under low shear mixing  
15       conditions to plasticize the plasticizable material without substantially destroying  
the at least one plasticizable material and to obtain a substantially homogeneous  
plasticized mass. The plasticizer content is substantially reduced and the  
temperature of the plasticized mass are substantially reduced prior to admixing  
the plasticized mass with the encapsulant to avoid substantial destruction of the  
20       encapsulant and to obtain a formable, extrudable mixture. The mixture is  
extruded through a die without substantial or essentially no expansion and cut  
into discrete, relatively dense particles. Release properties may also be  
controlled by precoating the encapsulant and/or coating the extrudate particles  
with a film-forming component.